Timestamp: 4/19/2016 2:51:49

Title of Proposed Observation:

Long-term Active Region Evolution

Main Objective:

To determine the long term evolution of the magnetic field and chromosphere and transition region of an active region

Scientific Justification:

Chromospheric and transition region heating in active regions are strongly correlated with the magnetic field. Various theoretical models predict that heating through braiding of magnetic field lines, reconnection with newly emerged flux, or dissipation of Alfven waves may play an important role in heating the chromosphere and transition region. To properly study the correlation between the magnetic field and low-atmospheric heating and to distinguish between various heating models, statistical studies of the long-term evolution of active regions are critical. Such long-term studies can track the evolution of both the fields and the chromospheric/transition region heating as an active region crosses from limb-to-limb, thereby providing access to a wider range of viewing angles (important to distinguish wave heating from other heating mechanisms), as well as providinginsight into the role of flux emergence in the energy balance of the chromosphere and transition region. Large raster scans of high-quality measurements of the photospheric magnetic field with SOT/SP, as well as deep exposures of chromospheric and transition region lines with IRIS and transition region and corona lines with EIS, every 8 hours over the course of several disk passages of active regions will provide unprecedented insight into these critical issues.

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Dates:

ToO.

Time window:

Need observations over 14 consecutive days at 8 hour cadence.

Target(s) of interest: Active region from limb to limb

SOT Requests:

164x164 Fast Map with SP, which takes just over half an hour: run 2 or 3 times during the IRIS observing if telemetry permits.

SP 0x0104 is Fast map, 164x164", 1-side, Q75, no repeat
SP 0x0172 is identical but with slightly lower telemetry usage
For a small AR, one of these could be modified to, say, 130x164" to save some telemetry

EIS Requests:

EIS study 373 (VHH_SlowAR_2h20_DPCM) which rasters a 256"x256" region with 60s exposure time for a range of lines.

XRT Requests:

Two filter observations (Al-poly and thin-Be) observations, with 30s cadence, AEC enabled, and FOV of 384"x384".

IRIS Requests:

Simultaneous with SOT/SP:
OBS-ID 3630010077 | Very large dense 320-step raster 105.3x175 320s Deep x 15 Lossles | 5322.88 | 8145.22 | 1.5 | 16.6+/-0.1 | 5323+/-0 | 66.5+/-0.0 | 66.5+/-0.0 | 66.5+/-0.0 | 66.5+/-0.0
If telemetry is an issue, then run:
OBS-ID 3620010077 | Very large dense 320-step raster 105.3x175 320s Deep x 15 | 5322.88 | 8145.22 | 1.0 | 16.6+/-0.1 | 5323+/-0 | 66.5+/-0.0 | 66.5+/-0.0 | 66.5+/-0.0 | 66.5+/-0.0

If time allows, after first OBS, run this:
OBS-ID 3630166078: Very large dense 400-step raster 131.7x175 400s Deep x 4 Spatial x 4 Spectral x1 Lossless
(takes about 40 min)

Additional instrument coordination:

None.

Previous HOP information:

Many HOPs and publications, but most recently HOP 236 which led to De Pontieu et al., Science, 2014, Rouppe van der Voort et al., 2015, Martinez-SYkora et al., 2016, Skogsrud et al., 2015, 2016, etc...
Also HOP 249 on spicules, led to Pereira et al., 2014, Skogsrud et al., 2015.

Additional Remarks:

Minimum duration of each run should be 1-1.5 hours, longer if telemetry allows

The target should be an active region as it crosses the disk (from limb to limb, observations every 8 hours).

Hinode pointing should be corrected for the usual SOT offset, but there are NO additional offsets internal to SOT.

The target coordinates could be chosen either by the Hinode or IRIS planners, depending on the

phase of the Hinode planning cycle. If the SAA-free periods are not used, then coordination between the planners to avoid SAA in both spacecraft is necessary. IRIS SAA-free times are approximately 11-15 UT and 23 - 04 UT.